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## **Political Failure: A Missing Piece in Innovation Policy Analysis**

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# Political failure: a missing piece in innovation policy analysis

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## Abstract

Within the field of innovation studies, researchers have identified systematic failures that hamper investment in R&D, innovation, and growth. Accordingly, researchers in this field often seek to provide policy recommendations on how to alleviate these failures. However, previous discussions have often been lacking considerations to the risks of *political failures*, meaning that policies fail to achieve their stated goals in a systematic manner. In response to this gap, this article aims to illustrate the concept of political failure and its relevance for innovation research. This is done by both discussing how political failure can impact innovation policy and by reviewing the prevalence of any discussions of political failure among top-ranked journals on innovation for the period 2010–2019, a total of 7,161 articles. The results show that consideration of political failure is scarce, with a small number of papers that have a substantial analysis of political failures. If the awareness of political failures could be increased, this could lead to better policy recommendations with a more nuanced discussion of the risks and limitations of public policy.

**Keywords:** Innovation policy, Political economy, Political failure, Market failure, Public choice

**JEL:** L52, O38, H81, L26, G28, P16

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# 1 Introduction

"It does not follow that whenever laissez-faire falls short government interference is expedient; since the inevitable drawbacks of the latter may, in any particular case, be worse than the shortcomings of private enterprise."

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*Henry Sidgwick - Principles of Political Economy (1887)*

Research that generates new ideas is considered of utmost importance for increasing and sustaining economic growth (Romer, 1990; Aghion and Howitt, 1992, 1997). Both exogenous and endogenous growth theory identify investments in research and development (R&D)—both public and private—as the main source of new ideas, which, in turn, generate new and improved technologies. At the same time, owing to the non-rival nature of ideas, innovation is often used as a textbook example of positive externalities, i.e., situations in which technologies benefit others in addition to those who invent them. Indeed, one study finds that as little as 2 % of the surplus of innovations is captured by their original inventors (Nordhaus, 2004). Following this rationale, most Western economies currently dedicate significant amounts of resources towards subsidizing firms and innovation, such as in the form of direct transfers, subsidized loans, tax reductions and tax exemptions, as well as government-backed venture capital (Becker, 2015b). The discussion on policy design has become more pertinent in recent years as policy makers have become increasingly interested in a more interventionist approach to industrial and innovation policy. This interest has, in turn, grown in parallel to reports of slowdowns in productivity growth among developed countries, which has sparked a vivid debate regarding the future of innovation and growth (Cowen, 2011; Gordon, 2016; Bloom et al., 2017; Bhattacharya and Packalen, 2020). Indeed, some scholars describe the

current lack of growth as a form of secular stagnation, predicting low overall growth levels in the coming decades (Summers, 2015).

In addition to concerns regarding weak productivity growth, other factors have likely contributed to the rekindled political interest in interventionism. Perhaps most notably, the threat of climate change has fueled the view that governments must take forceful action to transform the economy and heavily invest in the development of key sustainable technologies. These sentiments are, for example, reflected in the European Commission's ambitious Green Deal proposal (European Commission, 2019). Moreover, competition from a rising China—which employs a model of state-sponsored capitalism—has prompted further reconsideration. Proposals along these latter lines include the consolidation of industries into giant corporations that can compete with Chinese and American rivals (so-called European champions) and increasing investments in R&D to avoid falling behind in the development of strategically important technologies, such as artificial intelligence (Altmaier and Le Maire, 2019).

However, despite an increased political interest in industry and innovation policy, there is currently only limited knowledge within *innovation research* on how the political process might influence the outcomes of innovation initiatives. In particular, while previous studies have often sought to offer policy recommendations, less attention has been paid to the risks that the suggested policies themselves might fail, i.e., to the risks of *political failure*. This gap is, in turn, particularly troubling as newly proposed innovation policies could be affected by a myriad of factors, e.g., behavioral biases, organizational biases, and lobbying of established actors, before they are even implemented. To form an understanding of this phenomenon, the literature on political economy and public choice offer relevant insights on why public policies might sometimes fail to achieve their intended outcome, such as due to conflicts of interest among politicians, voters and special interest groups.<sup>1</sup> As such, the insights obtained

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<sup>1</sup>Formally, political or government failures occur when the effect of a policy, law, subsidy, etc. does not increase or even decreases social welfare compared to the market equilibrium (Le Grand, 1991). Within the context of this paper, the terms "political failure", "policy failure" and "government failure" will be used interchangeably to refer to the failure of the political process to achieve its stated goal(s).

from decades of research of the political economy and public choice holds significant potential for guiding researchers towards a better understanding of innovation policy and its effects. Understanding and mitigating these risks is, in turn, central for designing policy that is efficient in raising social welfare.

Given the relevance of political economy for innovation policy, the rising political support for interventionism, as well as the current omission of political economy from the innovation literature, it is imperative that the matter is further explored. In response to this gap, this paper aims to contribute to the academic debate by adopting a political perspective of innovation policy. Specifically, the aim of this paper is threefold. First, we aim to survey the literature concerning innovation and political failures to determine how the concept of political failure could be incorporated into the innovation literature, as well as how the inclusion of this perspective might alter policy conclusions hitherto produced. Second, we seek to conduct a text-based analysis of research published in leading innovation journals to determine the extent to which the risk of political failure is currently considered. This is done by analyzing all papers published in eight leading innovation journals between 2010 and 2019; a total of 7,161 articles. The focus on innovation journals is, in turn, motivated based on their relevance for policy design.<sup>2</sup> Third, having reviewed the literature, we aim to take stock of the current state of knowledge on political failure and to derive implications that can provide guidance for future research in the field.

Our analysis shows that key terminology related to political failure is indeed rare in the innovation literature—both in absolute numbers as well as in comparison to the occurrence of policy discussions. This implies, in turn, an impending risk that current recommendations may have unforeseen and adverse economic implications. Specifically, without adequately considering the prospects of political failure and finding solutions to these problems, there

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<sup>2</sup>For instance, innovation policy has been highlighted by the European Union as an important tool for creating an "Innovation Union" (Adam, 2014). Hence, the policy recommendations that are presented in leading innovation journals are also likely to have a large influence on what policy that is recommended by politicians and civil servants. If such recommendations are biased, this can in turn have large effects on public policy and economic growth.

is a risk that researchers may inadvertently promote inefficient policies that do not solve market failures because they become hampered by political failures. Our conclusion is that recommendations for public policy stand a greater chance of success if the policy solves a market failure while simultaneously seeking to minimize the risk of political failure. A similar critique has been stressed by [Karlson et al. \(2021\)](#) and [Lucas et al. \(2018\)](#) regarding public policies targeting entrepreneurship. As such, our work extends on theirs by examining the literature on innovation and innovation systems, which is of particular relevance for public policy.

The remainder of this paper is organized as follows. Section 2 discusses the recommendations in the existing innovation literature and the empirical evidence. Section 3 discusses the political economy, public choice theories of government failure and why these issues are relevant for innovation policy. Section 4 presents an empirical investigation of how the current innovation literature discusses political failures. Section 5 concludes and provides suggestions for future research.

## 2 What are the innovation research-based policy recommendations?

Innovation policy has exponentially grown in recent decades (see [Edler and Fagerberg \(2017\)](#)), both as a policy field and an area of science. However, policy often precedes economic theory. As such, theory helps expand or limit current policy development and, more importantly, explains why a policy might be logical. After World War II, basic research funding expanded in developed economies. For example, in the US, Vannevar [Bush \(1945\)](#) published a famous paper titled "The Endless Frontier", exhorting the U.S. government to make investments in research to solve societal issues<sup>3</sup>. Social scientists did not explain the

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<sup>3</sup>See e.g., [Leyden and Menter \(2018\)](#); [Gross and Sampat \(2020\)](#) for a discussion of Bush's legacy and current importance.

market failure of basic research until the late 1950s (Nelson, 1959; Arrow, 1962). In their and their successors' work, market failure led to the following two policy recommendations: 1) a strong argument for governmental spending on basic science since it is a public good and incentives for firms to invest in basic science are weak and 2) providing incentives for private firms to invest in R&D, e.g., by providing subsidies or strengthening the intellectual property regime (IPR) (Edler and Fagerberg, 2017). These arguments provided important guidance to policymakers for many decades.

While the idea of market failure has underpinned the argument for an active innovation policy, the exact extent of these market failures has been subject to debate<sup>4</sup>. For example, an imperfect capital market is an important assumption for many policies since imperfect capital markets contribute to under-investment in innovation projects. Whether capital markets are efficient, i.e., able to fund all projects with a risk-adjusted net present value above the risk-free interest rate, has been the subject of substantial research without any clear conclusions (Stiglitz and Weiss, 1981; Petersen and Rajan, 2002; Arnold and Riley, 2009). Subsidized firms should ideally be firms that are credit constrained and produce innovations with large positive externalities (Hall, 2002); however, the conclusions vary depending on how the innovation process is modeled (Walz, 1996). Furthermore, identifying such firms in practice is extremely difficult since none of the requirements are easily, or even at all, observable (Saracho and Usategui, 1994).

Market failure is often modeled in a static economy, but institutions change, demand change and even organizations change (Schmidt, 2018); thus, prescribing the socially optimal level of policies, such as direct subsidies, is challenging (Edler and Fagerberg, 2017). Tax credits and generous deductions are often used as a instrument to combat the negative effects of taxation on innovative activity (Rao, 2016; Akcigit et al., 2018).

Further complicating the situation, different market structures create different incentives for innovation (Levin et al., 1985; Calabuig and Gonzalez-Maestre, 2002; Grossman and Men-

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<sup>4</sup>See e.g., McCloskey (2019) for a historical discussion regarding the nature of market failures in economic theory.

doza, 2003; Aghion et al., 2005; De Bondt and Vandekerckhove, 2012). While firms that are locked in perfect competition might have an incentive to innovate, they could lack the financial resources. In contrast, monopolies have ample available resources but lack the incentive to engage in risky innovation. Hence, the most innovative firms could often be those who are in an oligopolistic market. Furthermore, firms' ability to be listed on a stock market (Nett, 1994) and the firm size (Shefer and Frenkel, 2005) affect both access to credit and incentives to innovate. In developing countries, the lack of efficient property rights and contractual laws play a considerable role in firms' ability to engage in innovative behavior (Cooter and Schäfer, 2012). Examples of the most common policy interventions in innovation policy range from fiscal incentives for R&D to cluster policies (cf. Edler and Fagerberg (2017), table 1) and schemes to promote collaboration among different organizations. New research streams have recently emerged to assess historical social and technological system transformations, and novel research investigating the impact of innovation policy on such transformation has been conducted (see, e.g., Geels (2004); Kuhlmann and Rip (2019)). These novel innovation policy practices are based on identifying certain societal issues that need to be addressed and then designing and implementing policies that involve different actors to solve these issues. These policies are highly complex initiatives and involve multiple actors during the invention process, and such policies are accompanied by selection problems, coordination problems, and evaluation issues that policymakers must address. As will be discussed below, there are several theoretical reasons why selection, identification and evaluation is complicated. Targeting the right firm, innovation or policy requires access to information that can be difficult to acquire ex ante, even for a skilled government agency. Firms have incentives to oversell their innovation, making it even harder to properly identify innovation is the most promising. Furthermore, political pressure to target firms and specific innovations often leads agencies to not use randomization when handing out resources, making ex post evaluation more difficult, reducing the ability to learn from previous mistakes.

Intellectual property (IP) rights, such as patents, represent a form of regulation aiming

to solve the problem that firms cannot recapture the high fixed cost of R&D if the ideas are easy to copy and have low marginal costs. In areas, such as pharmaceuticals, the fixed costs of developing a new drug can be enormous, whereas the marginal cost of imitation and production can be quite low. Strong intellectual property rights allow firms to recoup large fixed costs related to innovation and, therefore, provide an incentive for even more innovation (Kwan and Lai, 2003; Encaoua et al., 2006).

Regulations that force firms to adopt new technology are often recommended, especially policies related to energy and other environmental areas (Bibas et al., 2015). By forcing firms to use less energy in their production, these firms have very strong incentives to quickly increase their R&D efforts within that area. A similar but more direct intervention involves mandating firms to be more innovative to obtain access to funds from public procurement (Edquist and Zabala-Iturriagagoitia, 2012). With this approach, the vast funds that governments directly control can be used to pressure firms to increase efficiency in targeted areas.

Empirical evidence regarding the success of industrial and innovation policies is mixed. A survey by Zúñiga-Vicente et al. (2014) of 77 papers finds mixed results with respect to efficiency depending on the country and sector. Lerner (2009) argues that many direct public policies aiming to promote innovation and entrepreneurship have failed. Instead, he suggests that the role of government is mainly to ‘set the table’ by providing good institutions and public goods but leave the details to the market. In contrast, Mazzucato (2015, 2018) argues that public capital has been critical for many recent discoveries underlying products, such as the smartphone, and that private firms are too risk averse to pursue genuine research without help from governments. Therefore, governments are needed to not only provide institutions for entrepreneurship but also adopt a hands-on approach to innovation. Becker (2015a) and Bloom et al. (2019) conclude that public innovation grant schemes often have positive effects, but these effects are heterogeneous across different types of firms. Furthermore, domestic policy might have a limited effect if scholar and organizations do not have access

to international networks (Taylor, 2016).

The latest evidence also suggests that policy design is an important factor contributing to the success of the policy, at least for grant schemes Becker (2015a). Therefore, in the following section, we discuss the political risks that exist during the policy design process. What are the political risks and how can they affect innovation policy design?

### 3 Political economy, public choice and political failures

A short discussion of the history of the phrase *political economy* is interesting and informative. During the early formative years of economics as a science, economics was called political economy. The leading works were often specific regarding this issue, e.g., John Stuart Mill's *Principles of Political Economy*, David Ricardo's *On the Principles of Political Economy and Taxation*, and Jean-Baptist Say's *Traité d'économie politique*. For these scholars, it appeared obvious that economic decisions are applied in a political context, which currently is called an institutional setting (North, 1991). However, with the increasing focus on mathematical rigor and price theory, less attention was paid to political decision making until the birth of the public choice school, which subsequently became known as the field of political economy. This change marked a resurgence of the view that economic policy is created in an institutional and political setting and that this setting must be considered in both research and applied work. This focus has been especially important in discussion related to market failures<sup>5</sup>.

The public choice school, which originated in the U.S. in the early 1960s, began using economic methodology to address questions that had previously been viewed as belonging to political science<sup>6</sup> (Buchanan and Tullock, 1962). In the earlier economic tradition, the

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<sup>5</sup>The following early discussion of market and government failure can be found in Williams and Coase (1964): "Contemplation of an optimal system may suggest ways of improving the system, it may provide techniques of analysis that would otherwise have been missed, and, in certain special cases, it may go far to providing a solution. But in general its influence has been pernicious. It has directed economists' attention away from the main question, which is how alternative arrangements will actually work in practice. It has led economists to derive conclusions for economic policy from a study of an abstract model of a market situation. It is no accident that in the literature (and for that matter in Professor Caves's paper) we find a category 'market failure' but no category 'government failure.'"

<sup>6</sup>One early scholar in the public choice tradition was Knut Wicksell, and his work concerning the fairness

state was often modeled with an impartial social welfare function. An important public choice critique of this perspective is that policy is never created by an omnipotent and omniscient actor but rather evolves within a political context (Buchanan, 1959). Therefore, a social welfare function is not a useful concept, not even as a model, since it gives the wrong impression of how policy evolves.

The main assumption in public choice is that similar to consumers and firms in a market, politicians are interested in maximizing their utility and not (only) public welfare. This simple assumption leads to substantial changes in our understanding of how politics works and which models are suitable for explaining political behavior. An especially interesting area of research has been the interaction between private firms and politicians, with a focus on how firms and individuals attempt to influence policy in a way that favors themselves. Currently, public choice is a large and diverse field of study in both economics and political science.

In contrast, the political economy school is often considered to have evolved from a discussion regarding the importance of rules and stability in macroeconomics (Kydland and Prescott, 1977). For example, politicians often prefer low interest rates and large fiscal deficits before elections to create a boom and, thus, please voters; however, this behavior is not consistent with long-run macroeconomic stability (Rogoff, 1990). The seminal contributions in political economy include modeling how politicians are selected directly from the population and how this explains why policy does not converge to the opinion of the median voter (Osborne and Slivinski, 1996; Besley and Coate, 1997). These results are consistent with the more complex probabilistic voting models, which have become the main workhorse model in political economy.

An important area in political economy research has been the nature and effects on institutions as constraints on human behavior (North, 1991). Institutions that constrain behavior, make contracts possible and allow for positive technological change can have a

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of taxation subsequently became an inspiration for James Buchanan's work (Wicksell, 1896; Buchanan, 1987).

substantial positive effect on economic development and growth ([Acemoglu et al., 2005](#)). Institutional research includes economic development ([Acemoglu, 2010](#)), how voting and committee rules affect behavior in the U.S. congress ([Weingast and Marshall, 1988](#)) and how media affects political outcomes and elections ([Snyder Jr and Strömberg, 2010](#)). The success of institutional research has been very extensive, and currently, such research accounts for the main explanatory factors in economic growth theory ([Rodrik et al., 2004](#)). It is difficult to explain economic growth without referring to the importance of institutions, such as the rule of law, and how such institutions evolve.

Both schools have benefited from research in political science regarding rational choice and game theory ([Persson and Tabellini, 2002](#)). Compared to the more philosophical discussion regarding the origins of the state in the public choice tradition (see, e.g., ([Buchanan, 1978](#))), political economists typically rely on more formal game theory (see, e.g., ([Besley and Persson, 2009](#))). This paper does not further discuss the differences between the two approaches and instead refers interested readers to [Blankart and Koester \(2006\)](#). Here, we present a synthesis of research regarding when and why political action sometimes fails to improve the public good and how this applies to commonly suggested innovation policies.

As mentioned in the previous section, almost all innovation policies have a theoretical basis in the market and/or system failure argument. Due to positive externalities, imperfect credit markets and the nonrivalry of ideas, a laissez-faire market economy cannot be expected to produce the socially optimal amount of innovation and R&D. However, the tools used to solve these problems are likely to be quite susceptible to political failures since they involve targeting the correct firms, technologies and individuals. For example, [Schot and Steinmueller \(2018\)](#) argue for active policy-making to solve societal challenges with the help of innovation policy without mentioning the associated risks of political failures. This process creates a large informational problem for the state actor. Which firms should receive subsidies, grants or similar benefits and which firms should not? Furthermore, each firm or industry has incentives to use lobbying or other methods to increase their share of the

subsidy. This problem also exists when creating new rules and regulations that should favor a particular technology or steer resources in a particular way (Davidson and Potts, 2016).

In the next sections, we discuss more in detail the most common reasons that government policies fail to achieve their stated goals. We do this first in more abstract, general terms, and then discuss how this is relevant for innovation policy.

### 3.1 Why public policies fail: conflicting interests

Political failures often arise due to conflicts between the general interests of society and the interests of specific individuals, groups or politicians (Keech and Munger, 2015). In theory, politicians are supposed to act only in the public interest and maximize aggregate social welfare; however, this assumption is not realistic. Politicians are humans, and humans are imperfect and often self-interested (Cowen, 2005). For politicians, self-interest is often modeled as a desire to maximize the probability of being elected and re-elected. The incentive to be elected creates pressure to please the median voter since this voter is pivotal if the electorate's preferences are single peaked and can be ranked on a single scale, e.g., a left-right axis (Hotelling, 1929; Black, 1948; Downs, 1957). This median voter model has been the workhorse in both theoretical and empirical research for decades. A more complex and realistic set of models are called probabilistic voting models, and these models allow for more stable sets of equilibria (Lindbeck and Weibull, 1987, 1993). According to these models, politicians should woo marginal voter groups who can be easily convinced to change who they are voting for. The incentive to win groups of marginal voters leads politicians to pursue policies that are directed towards these groups and, therefore, can swing voters over to their block (Levitt and Snyder Jr, 1997; Elinder et al., 2015). While such policies could coincidentally also increase the general welfare of society, there is a high likelihood that so-called pork barrel spending could lead to a waste of resources since it does not target those who benefit the most from the spending but rather maximizes the amount of votes for a given sum (Cadot et al., 2006). Such models are often extremely for analyzing which

political equilibrium will be the results of competing interests, in the same way that economic models can predict the market equilibrium given a certain set of circumstances.

Specifically, regarding environmental innovation, innovation is often linked to more traditional methods, such as taxes and emission permits (Requate, 1998). The promotion of biofuels, which feeds into a narrative of reducing carbon emissions and reliance on imported fuels, might be more related to politics than economic or environmental efficiency (Skidmore et al., 2013). The outcome of ethanol subsidies, which represent an efficient way to reduce emissions and the consumption of fossil fuels, appears to be quite bleak (Pimentel, 2003; Hahn and Cecot, 2009). While the evidence is mixed, it is likely that subsidies related to ethanol have increased food prices and, therefore, contributed to a substantial reduction in welfare in developing countries, where food prices are of great importance, by diverting agricultural resources from food production to producing crops for ethanol (Collier, 2008). Thus, it is quite possible that the implementation of ethanol subsidies were driven by lobbying and rent-seeking by special interest groups rather than the desire for efficient reduction in carbon emissions<sup>7</sup> (Anthoff and Hahn, 2010; Helm, 2010).

Notably, it can be argued that the limited success of ethanol subsidies was not obvious at the time of implementation, but this raises the question of why these subsidies have not been removed. According to Dur (2001), politicians are reluctant to remove inefficient policies since voters might interpret this change in policy as a sign of incompetence. Hence, once implemented, an inefficient policy might be difficult to remove due to the negative effect the removal could have on the individuals and industries that benefit and due a lack of interest from politicians who care about their re-election chances<sup>8</sup>.

Pressure to be "politically correct" might also distort the information that policymakers

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<sup>7</sup>The case of ethanol appears to fit the "baptist and bootleggers" narrative, where the interests of individuals concerned with the environment coincide with the financial incentives of farmers and ethanol producers.

<sup>8</sup>In the case of ethanol, an interesting fact is that the first U.S. state to vote in a primary is Iowa, a major corn growing state. A U.S. presidential candidate that seeks to remove subsidies related to ethanol and, thus, corn growers, could face a major challenge in the first primary election. For example, John McCain was strongly opposed to ethanol subsidies and did not even attempt to win the primary in Iowa in 2000 and fared poorly in 2008.

receive, which can prevent relevant information regarding policies that do not work, thereby preventing bad projects from being cut off from funding (Morris, 2001). For example, some politicians portray themselves as supporters of small businesses likely because this group represents a large group of voters even though small business activity is a poor proxy for entrepreneurship (Henrekson and Sanandaji, 2014), and high-growth firms are often one-hit wonders (Daunfeldt and Halvarsson, 2015). High-value entrepreneurship can create massive gains for founders, and therefore, it might be challenging for public policy, especially in egalitarian welfare states, to be involved in creating extremely rich individuals (Sanandaji and Leeson, 2013). Therefore, policy might focus instead on less successful firms, even though this approach is inefficient, simply to avoid creating large profits and increasing inequality.

### **3.2 Why public policies fail: the pretense of knowledge**

Another reason for political failures is the lack of information. It is well known that economic agents, such as firms and consumers, might struggle to obtain the information necessary to make the optimal decision in a given situation. Therefore, all aggregated decisions of the market represent a much better mechanism for setting prices and predicting future outcomes than individual agents (Hayek, 1945, 1989). However, under genuine uncertainty, which is the case in the field of innovation, it is impossible to know the future and which new inventions will be the next technological paradigm. Politicians and civil servants must not only attempt to gather as much information as is available for market participants but also find even more information to attempt to overcome the asymmetric information causing the sub-optimal allocation by the market. Information is of particular importance in an innovation policy setting since innovation often involves obtaining correct information regarding preferences, technical possibilities, market potential etc. (Potts, 2019).

The informational hurdle is substantial. Markets are often quite efficient in aggregating information via the price signal from individual firms and consumers. When markets fail due to asymmetric information, it is not obvious how governments should respond. Sometimes,

mandatory insurances, such as in health care ([Arrow, 1963](#)), can be useful since they remove the ability of firms to select their customers. When such solutions are not possible, the solutions are less clear since public agencies and civil servants need to gather as much information as possible regarding the market. Since governments do not exist as a single entity, this information also needs to be disseminated to the individuals responsible for providing the money, deciding which research cluster to promote, etc. This problem persists even when independent agencies attempt to select the most promising projects and firms regardless of their technological background. It is extremely difficult to ex ante know which investments will be successful. For example, [Puri and Zarutskie \(2012\)](#) find that 40 percentage of the VC funded firms in their sample fail, whereas almost 80 percent of non-VC funded firms fail. This large failure rate exists despite the extremely strong incentives for VC firms to find the most successful ventures. It is unlikely that civil servants, who are not residual claimants to the profits of successfully backed projects, are able to vastly improve this outcome. The knowledge problem regarding entrepreneurship policy is also stressed by [Lucas et al. \(2018\)](#).

Some policies might be too complex to survive intact. For example, [Acemoglu et al. \(2018\)](#) shows that welfare can be increased when governments implement policies that tax the production of incumbents and subsidize R&D for both incumbents and new entrants. The idea is to increase the pressure on inefficient firms to accelerate the reallocation of skilled labor to more productive firms. This suggestion is interesting, but an evaluation of such policy has to include an in-depth analysis of how it was implemented and control for the risk of being captured by special interests and distorted. Some scholars of innovation systems recommend a "holistic" innovation perspective (see, e.g., [Edquist \(2019\)](#)), implying that a multitude of policy instruments must be used to optimize the innovation system. While such an approach may be beneficial to society in theory, it also increases the toolbox for politicians that seek to benefit certain interest groups. The complexity also renders policy-making less transparent, and therefore, it is easier to conceal giveaways to special interests and difficult to evaluate the efficacy of the policies ex post. Empirical evidence suggests that corruption

decreases both the quantity and quality of innovation (Dincer, 2019).

### 3.3 Why public policies fail: rent-seeking

Upon a closer examination, the vast economic resources that modern governments control via both taxation and licenses and regulations create incentives for firms and groups of individuals to divert these resources to themselves, which is called rent-seeking because if a firm can convince the government to grant it subsidies or hinder competition via legislation or tariffs, this action can ensure that the firm receives profits far greater than could have been possible in an unhindered market (Tullock, 1967; Krueger, 1974). Rent-seeking is pervasive in most societies and had large negative effects on long-run economic growth (Murphy et al., 1993). In their overview, Acemoglu and Robinson (2012) provide evidence suggesting that when narrow interests succeed in capturing and bending the entire political process for self-benefit, the consequences on economic growth and development can be devastating.

More specifically, special interest groups (SIGs) are often skilled in persuading politicians to implement policies in their favor. For example, since a small group has less collective action problems than a large group, it is easier for farmers to lobby politicians in favor of agricultural subsidies and tariffs (Olson, 1965). The drawbacks of such policies fall on consumers, who, on average, are subjected to slightly higher food prices. This price increase is not sufficiently large for a large and heterogeneous group of consumers to organize and lobby for changes in the opposite direction. Efficient SIGs can often be skilled in extracting large rents in return for political support to established politicians while making it appear that they are acting in the public interest (Grossman and Helpman, 1994)<sup>9</sup>. Therefore, when a policy is implemented, it must be designed in such a way that creates incentives for productive rather

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<sup>9</sup>Indeed, inefficient policy design is often the result of the "baptists and bootleggers" phenomenon, i.e., poorly informed activists align with those who benefit economically from bad policy design. *"The term stems from the southern United States, where in the past and even currently, Sunday closing laws prevent the legal sale of alcoholic beverages, which is advantageous to bootleggers, who sell alcoholic beverages illegally; they have the market to themselves on Sundays. Baptists and other religious groups support the same laws but for entirely different reasons. They are opposed to selling alcohol, especially on Sunday. They take the moral high ground, while the bootleggers persuade politicians quietly behind closed doors."* (Yandle, 1983; Yandle and Buck, 2002).

than unproductive or even destructive entrepreneurship (Baumol, 1990).

The introduction of innovation policies changes the incentives of private and public actors. If money-generating activities other than the market are available, such as applying for grants, some firms might change their behavior. Firms with a comparative advantage in seeking subsidies might gain more from subsidies than market activity and focus their effort accordingly. This sorts firms into the following two types: firms that mainly act in the genuine market and firms that mainly survive on the political market. Therefore, firms specialized in acquiring subsidies, tax breaks, etc. out-compete other firms in this activity, and ultimately, almost all subsidies will be targeted toward ‘subsidy entrepreneurs’ (Gustafsson et al., 2020). This result is problematic since it is unlikely that these firms will produce the most social benefit from their grants. If policymakers do not consider the change in incentives, specifically how incentives change over the long run when information regarding how to bait the system is disseminated, the policy may not have the intended effect.

### **3.4 Why public policies fail: regulatory capture**

Many industries are regulated, and the intention of the regulation is to align the behavior of firms with public welfare. However, it is possible for firms to change the rules in such a way that they favor the incumbent firms, often by reducing pressure from competition. This process is called regulatory capture since firms and SIGs "capture" the rule-making process and influence the rules in their favor rather than public interest (Stigler, 1971; Peltzman, 1973; Dal Bó, 2006). Regulatory capture has been strongly debated following the financial crisis in 2008. Large banks were considered to have the ability to bend rules and regulations in their favor during the years leading to the crisis, with detrimental consequences for society as a whole (Zingales, 2012; Carpenter and Moss, 2013; Manish and O’Reilly, 2019).

Regulation is another policy tool that can be used to influence innovation. For example, tougher fuel economy standards could spur innovation to produce more efficient cars (Nentjes et al., 2007). However, regulations could very well be designed and/or enforced in such a

way that they actually lower social surplus, such as by erecting barriers to entry for new firms (Chambers, Collins and Krause, 2019; Chambers, McLaughlin and Stanley, 2019). It is difficult for a politician or the public to distinguish between calls for regulations driven by genuine concerns, such as safety concerns, from those driven by concerns to eliminate competition (Juma, 2016).

In theory, patents should provide incentives for large investments in R&D to reap monopoly profits during the patent's duration while simultaneously encouraging the diffusion of knowledge when the patent expires (Ireland, 1988; Waterson, 1988). However, in practice, the impact of patent laws on innovation is complex, and the optimal design of the intellectual property regime remains debatable in terms of the types of inventions that can be patented (Thomas, 2008; Sakakibara and Branstetter, 1999) and for how long a patent should be valid (Horowitz and Lai, 1996; Posner, 2005). Some research has found evidence that stronger patent rights are beneficial for innovation and economic growth (Hu and Png, 2013). In contrast, it has also been argued that in some cases, patent laws help established firms block competition rather than increase overall innovation (Boldrin and Levine, 2002, 2008; Bessen and Maskin, 2009; Moser, 2013; Boldrin and Levine, 2013). In recent decades, scholars of intellectual property law have increasingly recognized that political economy forces help shape the IP regime (Merges, 2009). Landes and Posner (2009) emphasize that private gains from strengthened IP rights can be very large, creating strong incentives for firms to lobby governments to influence IP laws. Merges (2009) examines the problem of patent trolls who buy patent rights to aggressively litigate against others and extract lucrative legal settlements without actually contributing to innovation. According to Merges, due to the influence of interest groups who wish to preserve the status quo, it is difficult for the US Congress to change patent laws to prevent rent-seeking activities by patent trolls.

The duration of copyrights has significantly expanded during the past centuries, with a possible positive effect on innovation and creativity (Giorcelli and Moser, *Fortcoming*). Schlackman (2018) argues that this expansion is partially due to the lobbying efforts exerted

by Disney to prevent Mickey Mouse, who was first seen in 1928, from falling into the public domain. Whether these changes have been beneficial to society remains unclear. [Posner \(2005\)](#) note that when the term lengths of IP rights have been expanded retroactively for older IP assets, such as Mickey Mouse, there is no any positive incentive effect on future innovation. However, welfare is transferred from consumers to producers, giving the latter a clear incentive to lobby for expanded term lengths. [Boldrin and Levine \(2004\)](#) question whether the government should be involved in protecting IP rights given its susceptibility to regulatory capture. These authors conclude that "allowing the government to grant monopolies is extremely dangerous". Regardless of one's views regarding how IP laws should be designed, clearly, the conclusions regarding IP rights heavily depend on the assumptions one makes regarding the political dynamics that shape laws and regulations.

In summary, there are numerous ways that innovation policies can fail. The problems of incentives and information are intertwined and often strengthen each other. Governments need information to be able to design policy, but this information is difficult to obtain, and the actors who can supply such information might have incentives to skew it in their favor. It is difficult for public policies to both solve problems related to asymmetric information and be robust from selfish motives by market actors and SIGs. Policies aiming to solve market and innovation system failures and, therefore, increase social welfare might very well backfire and result in less social welfare if they are affected by political failure. We summarize the policies and related risks in [Table 1](#).

Table 1: Summary of political risk of innovation policy

Innovation policy	Political risk
Subsidies	Rent-seeking, pork barrel spending
Innovation friendly regulation	Regulatory capture
Promoting specific technology	Regulatory capture, rent-seeking, knowledge problems
Intellectual property	Regulatory capture, rent-seeking
Tax policy	Rent-seeking

## 4 Do innovation scholars study political failures?

Given the risk of political failure in policies that are typically recommended to improve innovation, it is of great importance for scholars who study innovation and provide recommendations regarding policy to be aware of the typical forms of political failures. If recommendations for policy changes also consider political failures, the chances of success should be greatly improved. At least, recommendations for policy changes should consider the risk of political failure, even if it is impossible to derive an efficient solution to mitigate these risks. If the risk of political failure is too high, it might be better to not recommend any policy. Furthermore, [Lewis \(2020\)](#) recently noted that the innovation system approach to innovation policy might have under-estimated the informational demands this approach exerts on policy-makers.

Some scholars consider political risk when giving policy recommendations. For example, [Hassler et al. \(2016\)](#) discusses the political risk of carbon taxes versus cap-and-trade policies for reducing carbon emissions. Since cap-and-trade schemes are easier to manipulate and some firms with good political connections receive free permits, carbon taxes might be a more efficient way to reduce emissions. This type of reasoning in which political and market failures are considered simultaneously has a greater chance of producing efficient policies than when only market failures are considered.

Some studies address the risk of political failure without referring to research concerning the subject. In a study investigating innovation systems and sustainable technologies, the authors address the challenge of translating their insights into policy as follows: "Dealing with these three issues requires policy makers to develop a range of characteristics – high analytical competence, in-depth knowledge of relevant technological systems, co-ordination skills, patience, flexibility and political strength – characteristics which policy makers can neither automatically be assumed to have, nor be expected to develop." ([Jacobsson and Bergek, 2004](#)), further suggesting that even when scholars are aware of the importance of political institutions and how political decision making could differ from simply maximizing

the social surplus, there is a lack of awareness of the previous literature regarding this subject.

## 4.1 Quantitative text analysis

To determine the extent to which current research concerning innovation policy considers political failures, we conducted a text analysis of leading innovation journals during the 2010-2019 period. The aim of this exercise is to identify core discussions regarding political failure within the body of innovation research. Our choice to focus on innovation journals is motivated by the large policy relevance of the opinions expressed in these journals. While topics related to political failures are studied in journals that are dedicated to the study of Public Choice or Political Economy, it is unlikely that policymakers should take these perspectives into account when reading innovation literature unless these perspectives are directly implemented in the relevant policy article.

Unfortunately, however, there is no exact definition of the top journals in innovation compared to e.g. the top 5 economics journals ([Heckman and Moktan, 2020](#)). Consequently, the selection of the abovementioned journals is at least partially influenced by the subjective views of the authors.<sup>10</sup> The surveyed innovation journals were selected based on the ranking from [Thongpapanl \(2012\)](#) and [Google Scholars](#) category "Entrepreneurship and Innovation", and we chose to include high-ranking innovation journals that promote the importance of public policy as defined in their aims and scope of the journal. This approach resulted in the selection of the following 7 journals: Research Policy (RP), Technological Forecasting and Social Change (TF&SC), Science and Public Policy (S&PP), Industrial and Corporate Change (ICC), Technovation, Journal of Technology Transfer (JoTT) and Economics of Innovation and New Technology (EI&NT). In addition, we added a leading environmental innovation journal, Environmental Innovation and Societal Transitions (EI&ST). The aims and scope of each journal is presented in the Appendix.

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<sup>10</sup>However, although the absolute ranking of innovation journals may be contested, the identified journals are considered well-established within their respective fields, whereby the encompassed discussions likely significantly influence the field's overall discourse.

All articles published in the surveyed journals during the 2010-2019 period were downloaded from their respective websites, yielding a total of 7,161 papers <sup>11</sup>. After identifying all relevant articles, the articles are searched for references related to keywords and phrases that are commonly related to political failure. This terminology was selected based on representations in leading textbooks, such as [Persson and Tabellini \(2002\)](#) and [Mueller \(2003\)](#)<sup>12</sup>. The process of identification involved both automated search protocols, as well as manual verification of each observation. The exact methodology is explained in the Appendix. Notably, it is possible for a single paper to contain multiple words. All keywords are directly related to our above discussion on why innovation policy could face difficulties, such as rent-seeking or regulatory capture. We also include more general terms such as political failure and political economy, to ensure that we capture discussions that might use a different terminology. The identified terminology includes "rent-seeking", "pork barrel", "median voter", "special interest groups", "regulatory capture", "lobbying", "budget maximizing", "political failure" and "political economy". The results are presented in [Table 2](#).

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<sup>11</sup>This includes a limited number of editorials and book reviews.

<sup>12</sup>The identified terminology was cross-referenced against the terminology used in articles published in the journals *Public Choice* and *European Journal of Political Economy* during the 2010-2019 period.

Table 2: Empirical investigation of political failure in journals publishing innovation studies

	RP (1)	TF&SC (2)	S&PP (3)	ICC (4)	Technovation (5)	JoTT (6)	EI&NT (7)	EI&ST (8)	Total mentions (9)
<b>Rent-seeking</b>	27	16	8	17	5	7	8	8	96
Percentage	2.0	0.6	1.0	3.1	0.9	1.2	2.0	2.2	1.3
<b>Pork barrel</b>	2	3	2	1	1	0	0	0	9
Percentage	0.1	0.1	0.3	0.2	0.2	0	0	0	0.1
<b>Median voter</b>	0	0	1	0	0	0	0	0	1
Percentage	0	0	0.1	0	0	0	0	0	0
<b>Special interest groups</b>	10	20	7	0	7	0	2	5	51
Percentage	0.9	0.8	0.9	0	1.3	0	0.5	1.4	0.7
<b>Regulatory capture</b>	12	4	4	3	1	0	0	1	25
Percentage	0.9	0.2	0.5	0.5	0.2	0	0	0.3	0.3
<b>Lobbying</b>	78	120	70	31	13	7	6	79	404
Percentage	5.6	4.7	8.8	5.6	2.4	1.2	1.5	22.1	5.6
<b>Budget maximizing</b>	0	0	0	0	0	0	0	1	1
Percentage	0	0	0	0	0	0	0	0.3	0
<b>Political failure</b>	10	22	14	5	2	4	2	10	69
Percentage	0.7	0.9	1.8	0.9	0.4	0.7	0.5	2.8	1
<b>Political economy</b>	41	35	28	9	3	8	6	33	163
Percentage	3	1.4	3.5	1.6	0.6	1.4	1.5	9.2	2.3
<i>Total papers for each journal</i>	1384	2578	798	549	535	563	397	357	7161

Number of papers in which each keyword or phrase related to market or political failures occurs. The total number of papers represents all papers published within that journal between 2010 and 2019. The percentages are calculated by dividing the number of papers with a keyword by the total number of papers in the respective journal.



Following the text analysis, the semantic networks across the surveyed journals are illustrated using node, or "bubble", charts and the results are presented in Figure 1. The charts are constructed such that the size of each bubble represents the relative number of articles that contain the respective word or phrase.<sup>13</sup> Correspondingly, following the same principle, the thickness of each edge between the bubbles represents the number of article co-occurrences between words and phrases. Finally, for visualization purposes, the position of each bubble was assigned to minimize edge overlap. In Figures 2-9 in the Appendix, the bubble charts are plotted separately for each journal. For illustrative purposes, all connections between the words related to political failures are shown in red.

## 4.2 Results show a limited discussion of political failures

The results shown in Table 2 show that terms related to political failures are uncommon within the leading innovation journals. Most terms appear in less than one percentage of the papers that are included in the analysis. The most common term, and most general, is "lobbying", which is used in 5.6 percentage of all papers. This is surprisingly little, given that this term could be used in almost all discussions of policy and public interventions. Indeed, it could be used mainly as a way to persuade policymakers to take a certain action, rather than a discussion of the failures that can arise when special interest groups are able to change policy.

The second and third most common terms are "political economy" and "rent-seeking". This is unsurprising, given the broad nature of the concept political economy, which can be used in any situation where there is an interaction between markets and governments. Rent-seeking should also be commonly discussed in a context of public interventions towards firms. Still, only 1.3 percentage of papers even mention the phrase.

It is interesting that median voters, with one exception, is not mentioned in any paper in the selected journals, according to our analysis. While none of the selected journals specialize

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<sup>13</sup>Hence, repeated uses of terminology within articles are not considered in the current analysis.

in political economy or public choice, the lack of discussion of the workhorse model in explaining political equilibria given how important the political process is for understanding which policy will be selected. Politicians also often craft policy in such a way that favors median or marginal voters at the expense of the public good, which should be useful to consider when giving policy recommendations. Especially in cases where political actions are inefficient or lacking, a solid analysis of the reasons for this political failure would be of interest. While such models are simple compared to such a complex process as political process, they provide a useful way to discuss how policy suggestions will be implemented in practice in the political equilibrium.

It is possible that a scholar who finds heterogeneous or a lack of effect does not discuss policy. This could lead to a bias in our paper, for example that papers that do not observe an effect do not discuss the political failure that might have resulted in the lack of effect and we therefore do not observe this in our text analysis. It is also possible that papers that do not find clear positive results do not end up being published at all, due to publication bias ([Andrews and Kasy, 2019](#)). While this bias might exist, it is difficult to measure its exact scope.

Turning instead to Figure 1, the lines between each bubble graph show the connections (or lack thereof) between the terms. It is clear that the papers in our sample clearly discuss issues related to political implementations, as can be seen by the large nodes for the terms "Public Policy", "Innovation Policy" and "Policy maker". This is reasonable given the aims and scope of the journals, but strengthens our case that these journals are likely to contain a discussion of political failures. As was evident in Table 2, lobbying is the most common term and it is clear that it is related to most other topics. The terms related to political failures are related to almost all topics that are common in innovation journals, but uncommon. This further strengthens our main conclusion: the political failure methodology is relevant for most topics in innovation policy, but is seldom discussed.

### 4.3 Detailed analysis of relevant terms

The use of a term related to political failure does not necessarily indicate that a paper discusses such problems to a large degree. Indeed, the term could only be used in passing and the phrase would still be found by our text-analysis method. All papers with a relevant terms were manually analyzed to determine how extensively the term was discussed; our findings are summarized in Table 3. We define a term as being discussed in-depth if it plays a significant role in the paper, as opposed to just being mentioned in passing. If a term occurs more than once in a paper, this would in most cases be enough for it to be considered to have a significant role. A single mention could be enough if the paper goes on to have some discussion connected to that term, and especially if that discussion is relevant for the paper’s overall argument. The opposite would be when a term is not related to any other part of the paper’s main discussion, and is not elaborated upon after it has been mentioned which would lead the paper to be categorized as not having an in-depth discussion of that keyword. Overall, of the 714 papers that included one of our terms, only 257, or about one-third, discussed the term more extensively. This corresponds to 3.6 % of all the papers in our selected journals.

The term rent-seeking played a significant role in the majority of the papers in which it was mentioned. [Sanandaji and Leeson \(2013\)](#) discuss the importance of well-defined property rights to ensure a positive rather than destructive form of entrepreneurship. [Mazzucato and Shipman \(2014\)](#) discuss how rent-seeking in the financial sector results in traditional measurements of economic activity, such as the GDP, being misleading measurements of value creation. This is an excellent example of when laws and regulations favor rent-seeking at the expense of production, which, arguably, has a greater benefit for the general population<sup>14</sup>. [Feng et al. \(2019\)](#) specifically model rent-seeking processes within Chinese construction firms and its detrimental effect on workplace safety regulations, representing a sector severely

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<sup>14</sup>Interestingly, a similar claim was expressed by [Zingales \(2015\)](#) in his American Finance Association presidential address.

affected by rent-seeking and other forms of corruption. Interestingly, [Kealey and Ricketts \(2014\)](#) mention that they do not explicitly consider rent-seeking. Hence, even when the term rent-seeking is used, it does always necessarily mean that the paper actually discusses anything related to political failures.

The results are similar when examining a sample of the larger number (163) of papers that use the term political economy. The term is often used only once to suggest that policy needs to be implemented through the political system. One notable exception is [Haas \(2019\)](#), who provides an explicit political economy explanation of the differences in energy policy between Spain and Germany; the German closing of nuclear power plants was driven by lobbying from a civil society group and the decisions of elite politicians. [Li et al. \(2017\)](#) model different strategies to reduce carbon emissions, with a special emphasis on China and how different strategies affect economic outcomes. While the paper uses the term political economy several times in the context of the difficult negotiation surrounding carbon reduction (e.g., who will bear most of the burden, how the conflict between developed and developing countries should be resolved, etc.), this discussion is only based on common sense rather than previous research regarding political negotiations, voting models or the conflict between self-interested politicians and the (global) common good. This lack of discussion is quite interesting since it is reasonable to argue that a significant difficulty in combating global warming is mainly due to free-riding among nations, the short-term interests of voters and politicians, and lobbying by SIGs, such as oil producers and fossil dependent industries. Crafting policies that efficiently reduce carbon emissions most likely requires politicians to hold motivations that are endogenous to the model, but this seems to be uncommon in the current literature.

Lobbying was by far the most commonly occurring of our keywords, but our examination shows that it played a marginal role in three-quarters of the papers where it was mentioned. Some papers do however have a substantial analysis of lobbying and related political behavior. For example, [Barbier \(2011\)](#) discusses the impact that lobbying can have on distorting

the political process, such as when vested interest groups with substantial economic power are able to prevent efficient solutions to pressing environmental problems. This was further elaborated upon by [Wesseling et al. \(2015\)](#), with the car industry's resistance toward regulations that reduce pollution as an example. [Ensthaler and Giebe \(2014\)](#) discuss how lobbying can distort the allocation of funding towards R&D, and discusses a suitable auction mechanism that could reduce the problem. Finally, when a public program has been corrupted, lobbying often plays a vital role in ensuring the persistence of the problem ([Abrate et al., 2015](#)). In many cases, lobbying was furthermore referred to in a positive light, e.g. as an activity that can be used by advocacy coalitions to effect positive societal change, such as a transition of the innovation system to a more sustainable paradigm ([Meelen et al., 2019](#)) or increase technological development through networking ([Musiolik et al., 2012](#)), and not related to political failures.

The terms with the highest percentage of in depth discussions were political failure and regulatory capture. This is perhaps not surprising, given the clear and specific nature of the terms. For example, political failure was used by [Carvalho \(2018\)](#) to discuss the lackluster results of government subsidies to R&D. Likewise, if the government is unable to properly create a good institutional environment for the accumulation of human capital and creation of new knowledge, this can increase the technological differences between countries, as pointed out by [Radosevic \(2011\)](#) and [Amendola and Vona \(2012\)](#).

A good example of the impact of regulatory capture of innovation policy can be found when discussing government imposed standards. Official standards can potentially lead to more innovation due to reduced information asymmetries and economies of scale, but they could also be used by entrenched actors to reduce competition ([Blind et al., 2017](#)). Even when established actors use regulatory capture to try and prevent competition, some entrepreneurs are skilled in both circumventing the rules as well as creating political pressure for a change that will increase competition ([Eriksson et al., 2019](#)).

A few papers do have a solid discussion of political failures and are noteworthy. For exam-

ple, sustainable transition perspectives call for policies tailored for specific problems within a technological innovation system, which is in sharp contrast to "technology neutral" policies and gives much more responsibility to political actors. [Haley \(2017\)](#) critically examines how such policies can escape political failures by referring to the government failures literature. [Johnstone and Newell \(2018\)](#) explicitly highlight that "attention towards the role of the state is underdeveloped in the field" when discussing the role of government in transitioning the economy towards a more sustainable path. The paper both discusses the importance of lobbying, rent-seeking and political economy in a nuanced way. A similar discussion of the political challenges in pushing development of low carbon technology was explicitly modeled by [Hess \(2014\)](#). [Kern et al. \(2016\)](#) discusses how the political incentives, and voter support, interact with the typical economic constraints that exist for new technology, more specifically introduction of carbon capture and storage to reduce climate change.

These papers are among the few exceptions in which the researchers not only acknowledge the risk of more political power, but also present content in the paper that is related to the design of institutions that are less susceptible to these political risks.

Our interpretation of this result is that many innovation scholars do not discuss the literature related to government failures. The small number of articles that mention political failures suggests that political failures are for the most part not considered in a structured and consistent way. Notably, it could be argued that studying political failures is not the main aim of these journals, and that such discussion belongs to other fields. However, since there is a risk of political failures when recommendations are implemented, recommendations, in turn, increase the risk of policy failures if such risks are not taken into account. A solid understanding of the most common reasons for government failures could lead to policy recommendations that mitigate these risks.

Table 3: Results of manual text analysis

Keyword	In-depth discussion	Total no. papers	Share in-depth/Total
Rent-seeking	43	96	45 %
Pork barrel	4	9	44 %
Median voter	1	1	100 %
Special interest groups	18	51	35 %
Regulatory capture	22	25	88 %
Lobbying	109	404	27 %
Budget maximizing	1	1	100 %
Political failure	49	69	71 %
Political economy	64	163	39 %

Results based on manual analysis of all flagged papers. The share is the number of papers with a longer discussion of the relevant term divided by the total number of papers that mention the term.

## 5 Conclusions

Small changes in growth rates produce large effects on long-run GDP levels; therefore, any factor that might increase growth rates is important. Similarly, several large social and environmental problems in societies require new innovations and technological progress to solve. Therefore, it is of great importance that policies aiming to promote innovation are efficient. Thus far, the empirical literature concerning innovation and industrial policy has produced mixed results regarding which policies work and their dependency on sectors and countries. The aim of this study was to note that a successful policy must not only address market failures but also be robust to potential government failures. Markets respond to incentives to maximize profits not social welfare, rendering it difficult to improve incentives. Policies that appear to be beneficial to the public interest might be inefficient but cleverly marketed by a rent-seeking organization. Therefore, designing the optimal policy is far from easy when both the dynamics of the markets and the incentives of politicians are considered.

In summary, there are numerous reasons why the political process and public policies may not, in practice, lead to a solution to market failures or an increase in public welfare. Nevertheless, careful empirical evaluations clearly show positive results in some cases. According to the so-called robust political economy perspective, to succeed, policies must be

able to overcome both information and incentive constraints. For a policy to be effective, politicians must have access to sufficient information, which can be difficult to achieve without relying on the market (Hayek, 1945). When policies are designed in such a way that they solve both incentive and information constraints, there is a greater chance of success due to the "robustness" of the design (Leeson and Subrick, 2006; Pennington, 2010). Extending this framework to innovation policy is beyond the scope of this paper but could provide useful insights and recommendations for policy design. Our perspective could also provide a middle ground between those who seek to abolish ( e.g. Lucas et al. (2018); Karlson et al. (2021) ) and those who seek to drastically expand (e.g. Mazzucato (2015)) directed subsidies and regulations as an innovation policy tool. If such policies can avoid the risk of political failures, it is very likely that innovation and entrepreneurship policies can increase social welfare. If such risks cannot be mitigated, it could be possible that such policies do more harm than good, as suggested by the opening quote from Henry Sidgwick.

The empirical analysis in this paper suggests that only a small percentage of papers in leading innovation journals discuss topics related to political failures. While the term political economy does appear in some papers, it is often used as a catch-all phrase for discussions on how politics interact with markets, and not for a structured analysis of how the political process actually evolves. It is quite possible that the lack of understanding of political failure amongst scholars as well as policymakers is an explanation for lack of consistent positive effects from innovation policy. If it was a simple task to correct market or innovation system failure, then most innovation policies should provide a clear positive effects. This is however not the case, and systematic political failures is likely to be a much better explanation than simple mistakes (Lerner, 2009). While academic writing always must make trade offs due to limitations of knowledge and practical considerations, we believe that excluding an analysis of political failures from the innovation literature can have large negative effects in terms of sub-optimal policy recommendations. If innovation scholars were more aware of typical political failures, they could more easily give recommendations that at least to some extent

reduce the risk of such failures.

It is somewhat surprising that many scholars who have written about the importance of creative destruction, the evolutionary nature of technological development and bounded rationality in individuals and organizations did not consider political failures when providing policy recommendations. The logic behind government failures and market failures is often similar, and a trade-off exists between what is best for society and what is best for the individual regardless of whether the individual acts in the commercial or political market. Addressing market failure almost always involves the need to address the risk of political failures since policies evolve within a political context and are never created by a benevolent dictator working in isolation ([Holcombe, 2012](#)). Individuals have bounded rationality, and imperfections in the political system increase these limitations. Knowledge of political failures, and adopting policy recommendations to take these into considerations, is not a panacea and there is always a risk for failures for a multitude of reasons, not at least because of country specific institutions. Therefore, we must accept that a decent policy might be the best we can hope for ([Demsetz, 1969](#)).

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## A Text analysis methodology

To capture the surveyed terminology across articles, the analysis faces a number of challenges. First, there is likely to be differences in notation across both authors and journals. Second, the search process is likely to be challenged by the presence of non-printable—or trailing—characters in texts, e.g., symbols that have the appearance of ordinary spaces, tabs, and dashes, but that are represented by separate UNICODE and ASCII characters. Consequently, the existence of non-printable characters poses a significant obstacle to search accuracy, whereby their presence requires close methodological consideration.

The first step towards dealing with notational differences and non-printable characters is to shorten—or stem—search strings. By this, search terms are effectively reduced to the minimum length needed to capture the intended terminology. Accordingly, the use of stemmed strings implies the need for a multi-step process, where the initial search protocol retrieves a bulk of results—both relevant and irrelevant—that can be refined in later stages. The process of stemming can be undertaken manually, or computationally using stemming algorithms (e.g., [Sharma and Cse \(2012\)](#)). However, computational stemming is generally reserved for cases where there is an indeterminate number of distinct strings that need formatting, which is of lower relevance to the current analysis. Meanwhile, these algorithms suffer from the downside of having lower flexibility across contexts. Hence, with the aim of maximizing control, as well as string inclusiveness, the authors have instead opted to undertake manual stemming.<sup>15</sup>

Next, once stemmed, the search queries were executed using Mythicsoft’s Agent Ransack, which is a specialized search-tool aimed at large-scale data extraction.<sup>16</sup> This software can be understood as an enhanced variety of the built-in search tools commonly found in operating systems. By this it is specifically referred to that, in excess to the built-in tools of most operating systems, the applied software hosts far greater capabilities in reading and extracting text-based content from files, where it is compatible the vast majority of available file formats, including Portable Document Format (PDF) files. The utilized search strings and the gross number of search results are presented in Table 4.

In addition to returning search results, Agent Ransack also allows users to extract surrounding text data associated with each search term, as well as its position in the text. This allowed for identification of the contexts in which terms were used, as well as of whether terms were represented in text bodies, versus reference list.

Next, once collected, all search results were imported into STATA where they were run against a series of filters designed to exclude non-alphanumeric characters. In this process, only letters A–Z and numbers 0–9 were kept in the text, whereas all other symbols, including spaces, tabs, commas, and hyphens were removed. Moreover, to ensure conformity, all text was converted into lowercase. Once cleaned, all strings were searched for the full terminology of interest, now expressed in all lowercase and without hyphens and spaces. Within each article, the earliest occurrence of each term was thereafter selected, and its position recorded. Lastly, the position of reference lists within articles was also recorded, whereafter all occurrences with a higher position than their corresponding reference lists were excluded

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<sup>15</sup>Comparison with strings yielded from Porter stemming reveals similar results. Meanwhile, the computed strings were found to generally be longer and less inclusive.

<sup>16</sup>Additional information regarding this software can be found on the official [Mythicsoft webpage](#).

Table 4: Terminology of interest, search criteria, gross number of search results, and the use of case sensitivity. All surveyed journals, 2010–2019.

Terminology of interest	Search criteria	Gross number of search results	Case sensitive (Yes/No)
Rent-seeking	"rent"	131,271	No
Pork barrel	"pork"	75	No
Median voter	"median"	3,363	No
Special interest groups	"specia"	274	No
Regulatory capture	"regulato"	8,628	No
Lobbying	"lobb"	1,316	No
Budget maximizing	"budget"	5,766	No
Political failure	"polic" OR "polit"	168,248	No
Political economy	"polit"	29,038	No
Reference list <sup>ψ</sup>	"Ref" OR "REF"	7,168	Yes

Note: Distinct entries within articles are recorded as separate observations. In cases where multiple notations are relevant, the search process includes the Boolean operator "OR".

<sup>ψ</sup>Reference lists are included in the search process to help determine whether mentions are featured in the main text body or in the form of literature references, e.g., article, book, and journal titles. By allowing for case sensitivity in this specific query, the inclusion of redundant results is reduced, e.g., "preferences".

from the dataset.<sup>17</sup> In cases where reference lists were not identified—such as in editorials and book reviews—this latter condition was ignored.

Once collected, each observation was manually reviewed to ensure its compliance to the target population. In this process, a number of occurrences were removed as they derived from literature references. These entries corresponded to approximately ten percent of the initial dataset.<sup>18</sup> Next, to analyze the context in which terminology is used, the surrounding paragraphs of each identified instance were surveyed manually. In cases where authors were found to go beyond singular mentions of the surveyed terminology, the articles were also surveyed in their entirety. The included keywords and their corresponding article occurrences are presented in Section 2.

Lastly, to identify general terminology uses and their relation to the terminology of interest, all articles were analyzed using WordStat, which is a text mining software that allows for the identification of the most recurring terms, phrases, and idioms across large masses of text. The program is based on machine learning and systematically tests for common occurrences of terms and phrases of up to 5 words in length across articles. Moreover, this process excludes generic phrases and non-printable characters based on an extensive dictionary. Through this, it is possible to extract a ranked list containing the most common terms and phrases currently used in the literature. This allows us to form a comprehensive understanding of current terminology uses, including the prevalence of possible alternative terminologies related to political failures. Meanwhile, no such alternative terminologies were identified. After obtaining the most common terminology, the occurrence of the terminology

<sup>17</sup>In rare cases, the search process identified multiple possible entries for reference lists in the same articles. In these cases, the latest entry was selected to maximize inclusiveness. This was done to ensure that no articles were wrongfully omitted. By departing from an inclusive sample of articles, this allowed their domain to be accurately determined through manual reviews.

<sup>18</sup>Meanwhile, in many instances, the built-in search protocol of Adobe Reader failed to accurately identify terminology, despite its presence. This illustrates both the complexity of the problem and robustness of the employed search process as it actually outperformed the built-in functions of a prominent software dedicated to displaying and reading texts.

was calculated across articles along with their within-article co-occurrences.<sup>19</sup> Finally, after calculating the terminology uses and co-occurrences, the resulting data were processed using the network graphing software Gephi to visualize the semantic networks (Bastian et al., 2009). The use of semantic networks for visualization is chosen as it allows us to illustrate both the relative number of articles that incorporate the identified terminology, as well as the extent to which the identified terms and phrases are used together, i.e., whether they co-occur within the same article. The resulting semantic networks are presented in Figure 1.

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<sup>19</sup> For quality assurance, the 1000 most common words and phrases within each journal were reviewed to identify the use of alternative terminology related to political failure. The results of this exercise suggest that no such terminology is currently used.



Figure 3: Technological Forecasting and Social Change

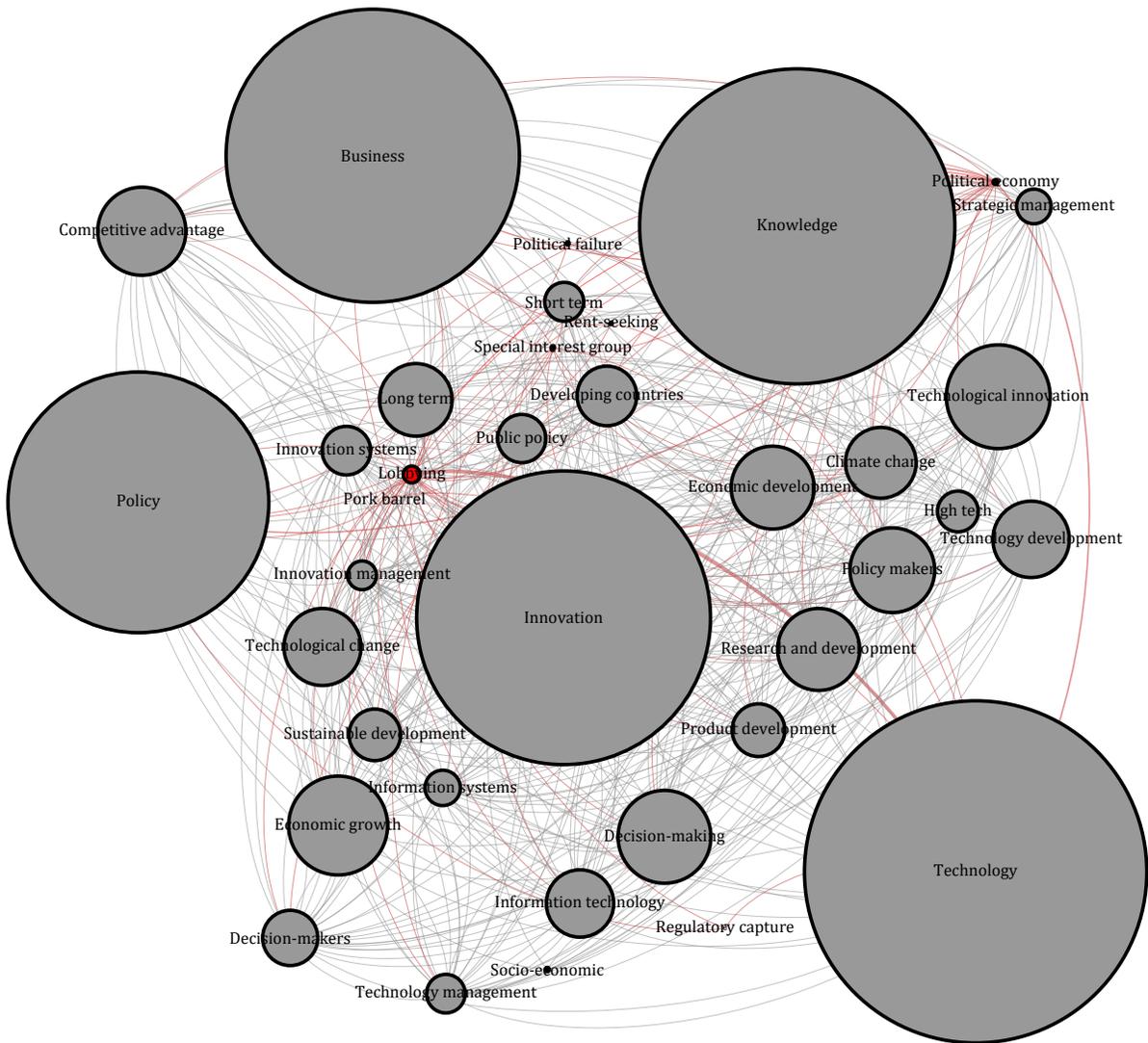


Figure 4: Science and Public Policy

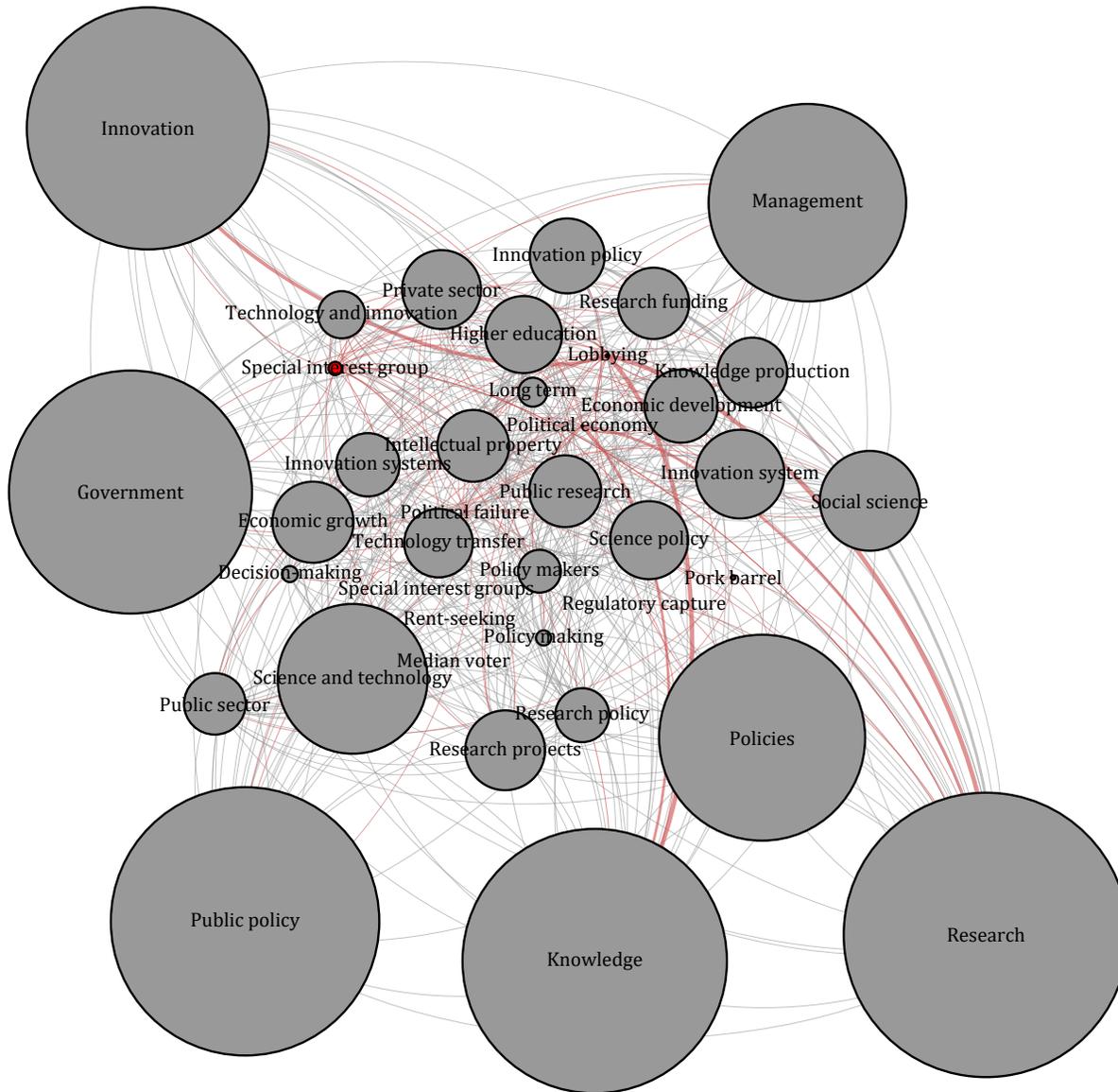


Figure 5: Industrial and Corporate Change

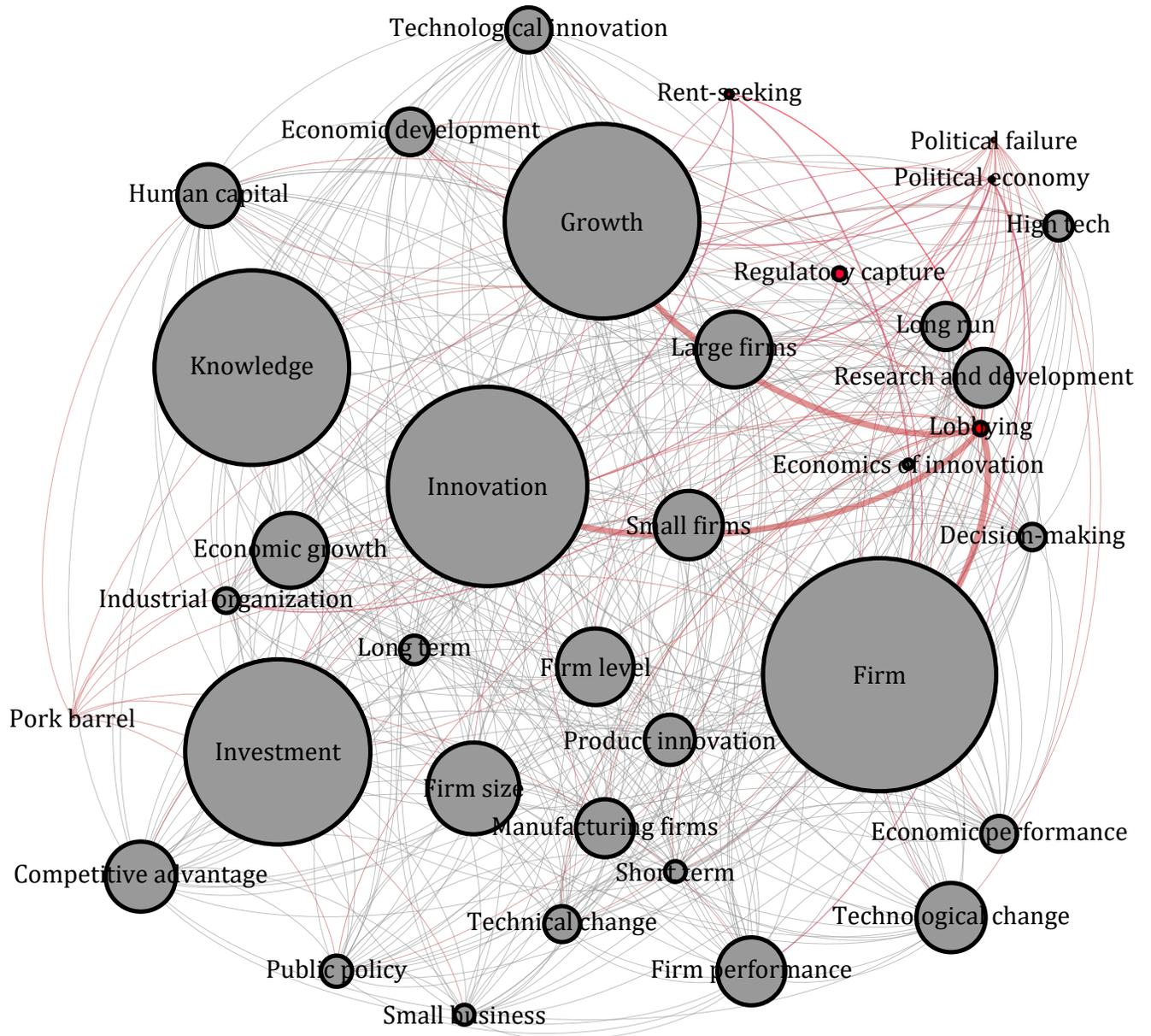


Figure 6: Technovation

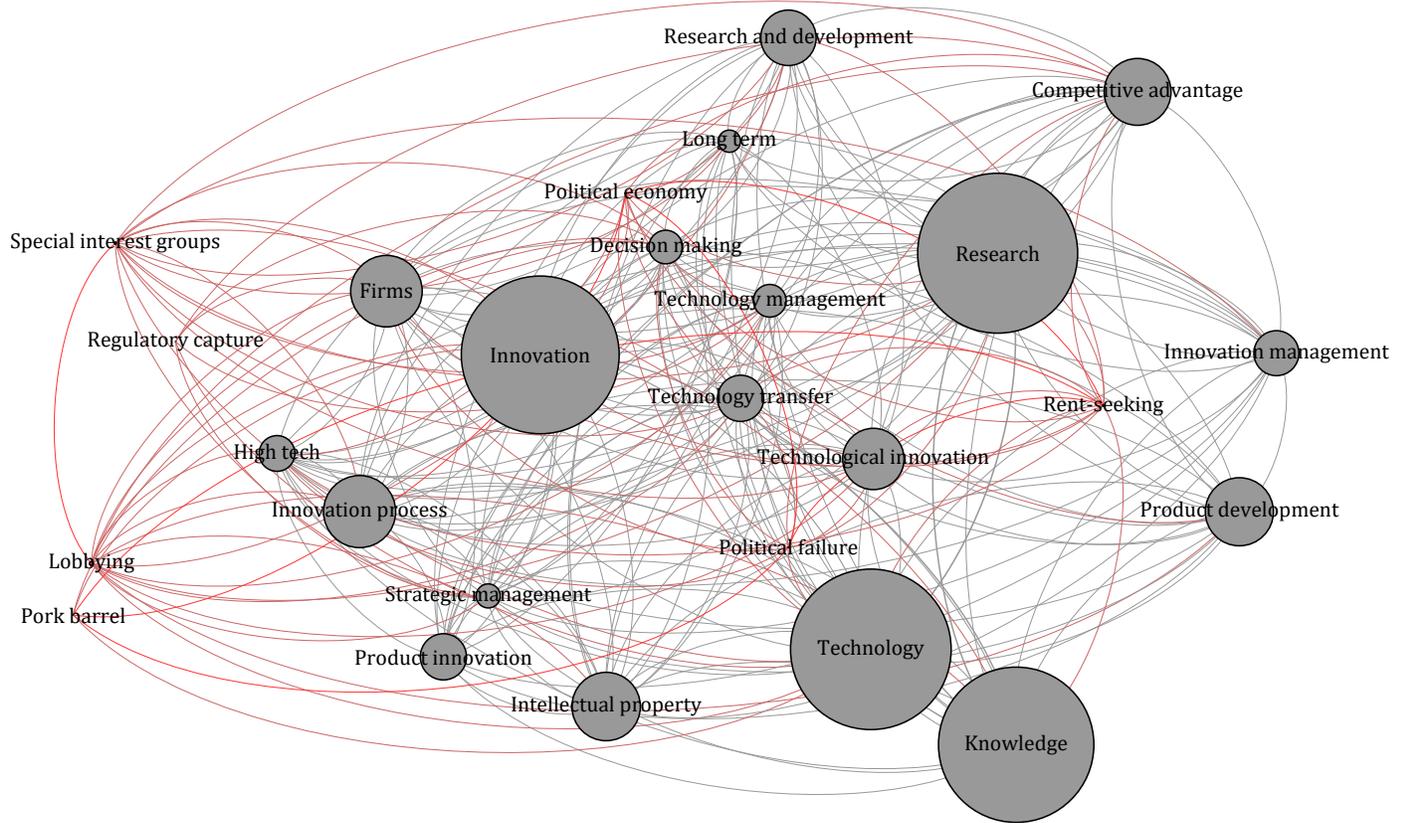


Figure 7: Journal of Technology Transfer

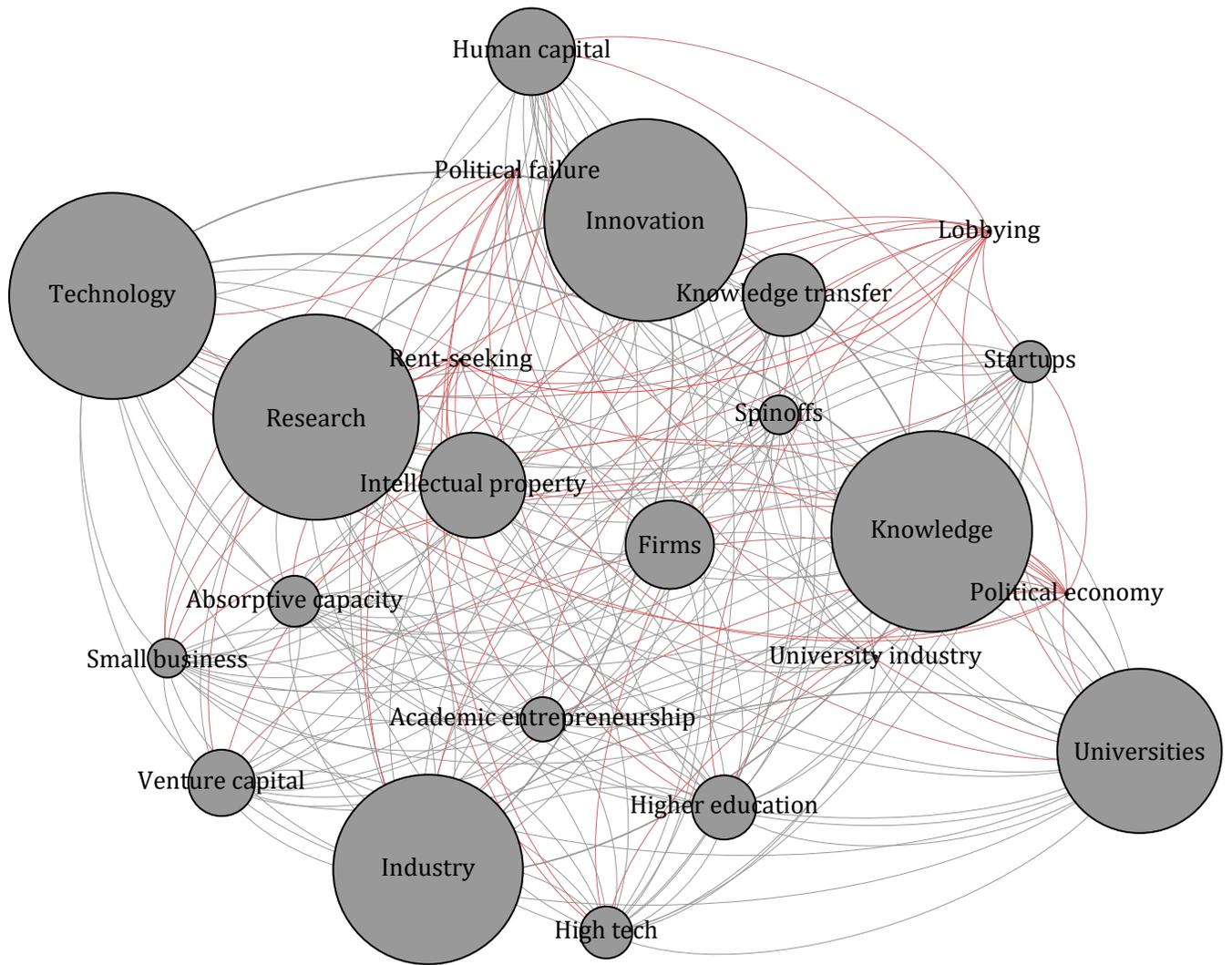


Figure 8: Economics of Innovation and New Technology

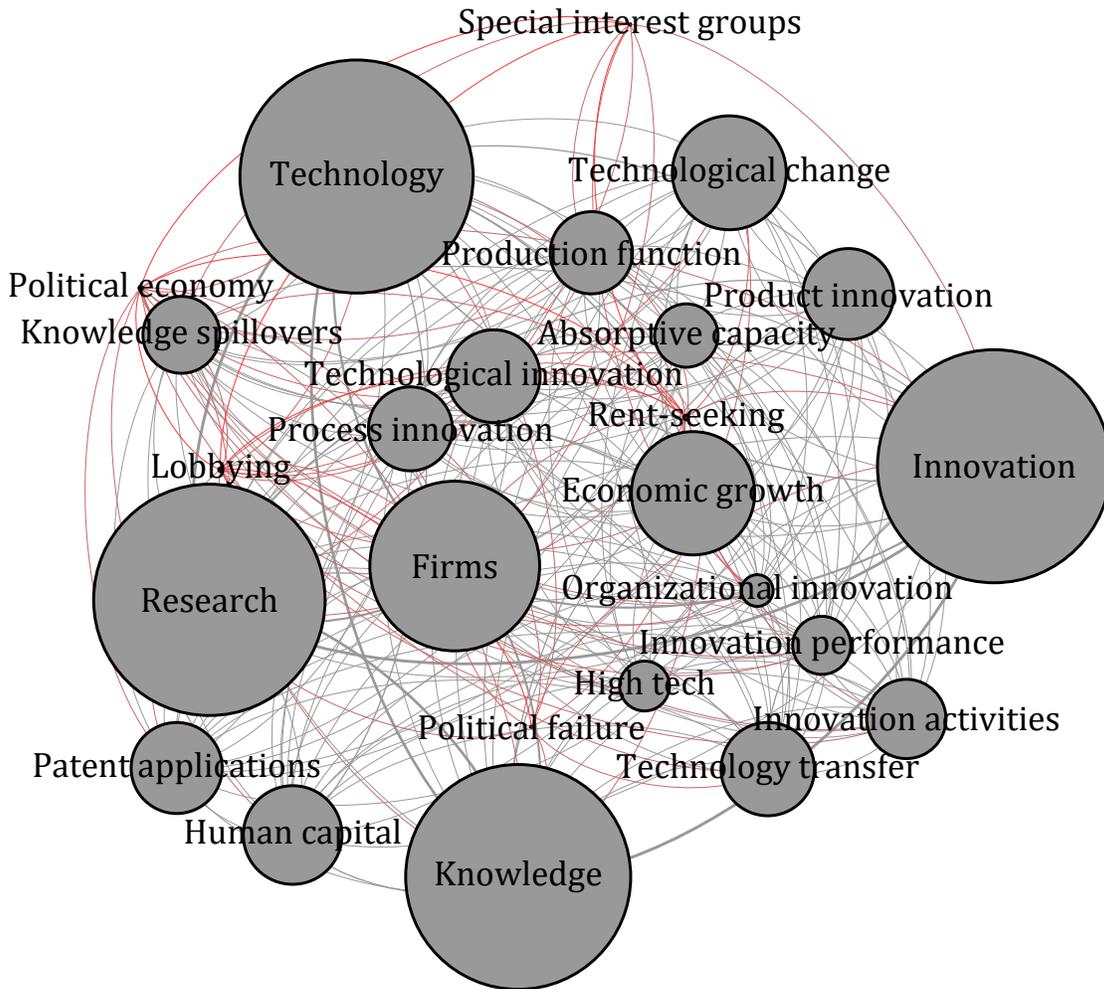
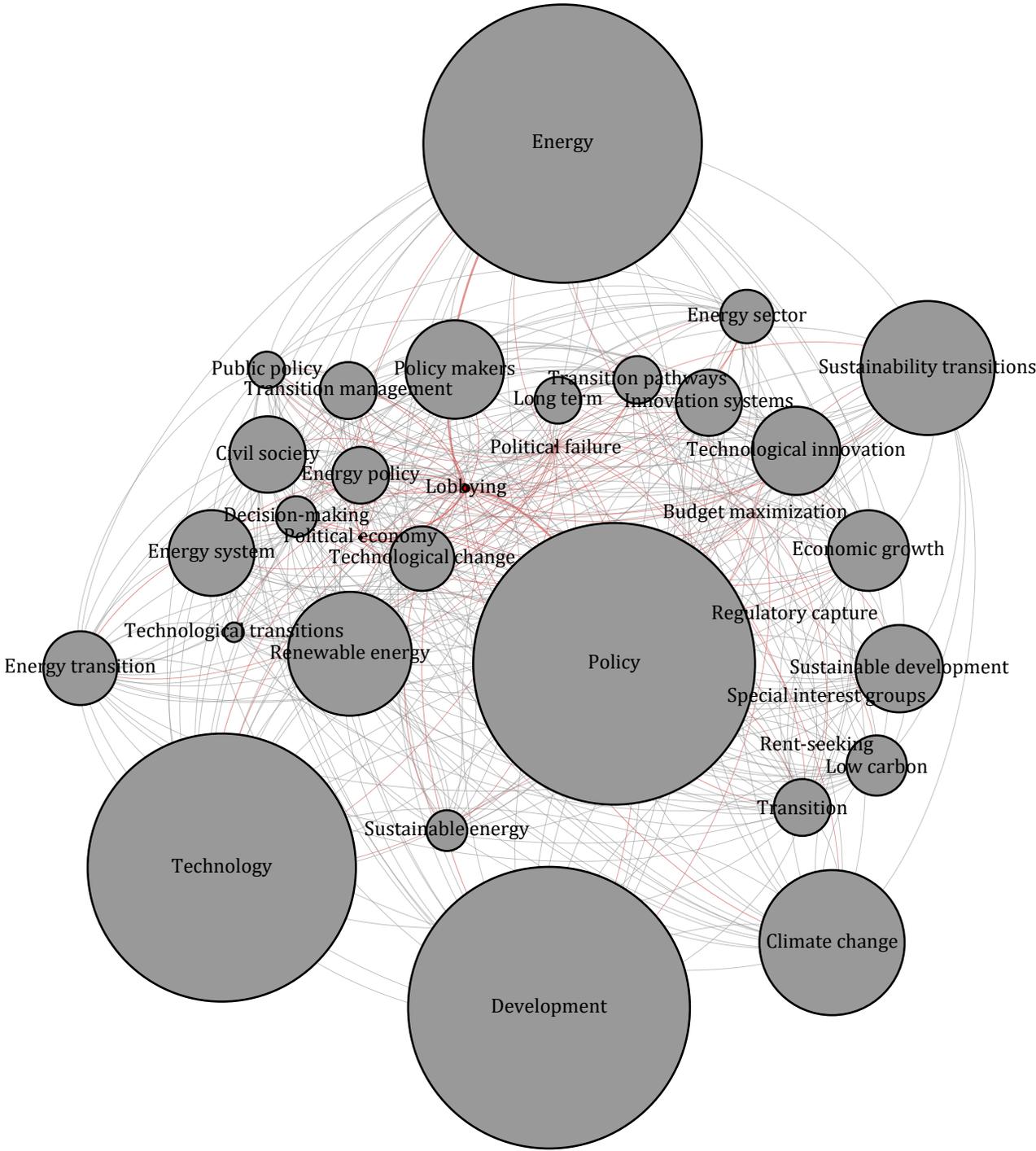


Figure 9: Environmental Innovation and Societal Transitions



## C Aims and scope of investigated journals

The aims and scope of the selected innovation journals are the following:

**Research Policy:** is a multi-disciplinary journal devoted to analyzing, understanding and effectively responding to the economic, policy, management, organizational, environmental and other challenges posed by innovation, technology, R&D and science. This includes a number of related activities concerned with the creation of knowledge (through research), the diffusion and acquisition of knowledge (e.g. through organizational learning), and its exploitation in the form of new or improved products, processes or services.

**Technological Forecasting and Social Change:** A major forum for those wishing to deal directly with the methodology and practice of technological forecasting and future studies as planning tools as they interrelate social, environmental and technological factors.

**Science and Public Policy:** Science and Public Policy is a leading international journal on public policies for science, technology and innovation. It covers all types of science and technology in both developed and developing countries.

**Industrial and Corporate Change:** Industrial and Corporate Change is committed to presenting and interpreting corporate organization and change, innovation, industrial structures and dynamics, drawing from a variety of disciplines, including economics, management, history, political science, and sociology. The ICC Editors strive to publish papers that have sound theory and appropriate methods, whatever the method may be, and that are relevant with clear implications for the economy, organizations, management, public policy, or society.

**Technovation:** This interdisciplinary journal encompasses all facets of technological innovation. Innovation is considered from both the perspectives of process and product, social innovations (regulation and policy as well as creation of non-economic benefit), conceptualization of a new technology-based product or process through commercial utilization. Topics include technological trends and breakthroughs; capital for new product development and commercialization; displacement of existing products, management of technology-intense entrepreneurial ventures; management of technological innovation in medium-sized and large organizations; appropriate organizational structures and practices; investment strategies related to new science-based or technology-based enterprises; the technological innovator as an entrepreneur, team-member, manager or employee; technology transfer to, from and between developing countries; technological innovation in all forms of: enterprise, political and economic systems.

**The Journal of Technology Transfer:** provides an international forum for the exchange of ideas that enhance and build an understanding of the practice of technology transfer. In particular, it emphasizes research on management practices and strategies for technology transfer. Moreover, the journal explores the external environment that affects these practices and strategies, including public policy developments, regulatory and legal issues, and global trends. Readers will find a broad range of papers, ranging from case studies to

comparative analyses.

**Economics of Innovation and New Technology:** is devoted to the theoretical and empirical analysis of the determinants and effects of innovation, new technology and technological knowledge. The journal aims to provide a bridge between different strands of literature and different contributions of economic theory and empirical economics. This bridge is built in two ways. First, by encouraging empirical research (including case studies, econometric work and historical research), evaluating existing economic theory, and suggesting appropriate directions for future effort in theoretical work. Second, by exploring ways of applying and testing existing areas of theory to the economics of innovation and new technology, and ways of using theoretical insights to inform data collection and other empirical research.

The journal welcomes contributions across a wide range of issues concerned with innovation, including: the generation of new technological knowledge, innovation in product markets, process innovation, patenting, adoption, diffusion, innovation and technology policy, international competitiveness, standardization and network externalities, innovation and growth, technology transfer, innovation and market structure, innovation and the environment, and across a broad range of economic activity not just in ‘high technology’ areas. The journal is open to a variety of methodological approaches ranging from case studies to econometric exercises with sound theoretical modelling, empirical evidence both longitudinal and cross-sectional about technologies, regions, firms, industries and countries.

**Environmental Innovation and Societal Transitions:** The journal offers a platform for reporting studies of innovations and socio-economic transitions to enhance an environmentally sustainable economy and thus solve structural resource scarcity and environmental problems, notably related to fossil energy use and climate change. This involves attention for technological, organizational, economic, institutional and political innovations as well as economy-wide and sector changes, such as in the areas of energy, transport, agriculture and water management. The journal aims to tackle the most difficult questions, dealing with social, economic, behavioral-psychological and political barriers and opportunities as well as their complex interaction. The journal is multidisciplinary in spirit and methodologically open, and invites contributions from a broad range of disciplines within the social, environmental and innovation sciences.